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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/603,119

06/24/2003

Peter J. Coyle

SAR 14779

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03/23/2005

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EXAMINER

ROGERS, DAVID A

ART UNIT

PAPER NUMBER

2856

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/603,119

Applicant(s)

COYLE ET AL.

Examiner

David A. Rogers

Art Unit

2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 2-8, 14, 18-24, 26, 28-30 and 32-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 9-12, 24 and 27 is/are rejected.
- 7) ☒ Claim(s) 13-17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date Various Dates.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. The terms “microfluidic” and “nanofluidic” in claim 10 are relative terms which renders the claim indefinite. The terms “microfluidic” and “nanofluidic” are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. That is, the applicant’s specification does not provide for any express definition of what sizes microfluidic or nanofluidic channels are intended to cover.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 9-12, 24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent to 6,468,330 to Irving *et al.* in view of United States Patent 6,550,347 to Bradley.

Irving *et al.* teaches an apparatus for collecting airborne particles comprising an air intake assembly (reference item 40), a separation section

(reference item 20), and a capture section (reference item 10). The capture section is a liquid collection chamber comprising at least one channel (reference item 16) that is adapted to transport the liquid to an analyzer. Irving *et al.* does not teach the use of a hydrophobic membrane.

Irving *et al.* does not expressly use the term “microfluidic” or “nanofluidic” to describe the size of the channel. However, as evidenced by the figures of Irving *et al.* the channel has a cross-sectional area and length that are substantially smaller than the reservoir in the base. This would be a microfluidic channel. Furthermore, the applicant’s specification provides no express definition of what sizes microfluidic or nanofluidic channels are intended to cover.

Bradley teaches an apparatus for collecting airborne particles comprising an air intake assembly (reference item 20), a separation section (reference item 40), and a base section (reference item 16). The air sampling apparatus further comprises supports (reference items 26 and 34) for supporting hydrophobic membranes (reference items 24 and 36). With regard to the upper membrane (reference item 24) Bradley teaches that it allows air to pass to the air outlet (reference item 22), but prohibits water (in its liquid form) from passing. This membrane will also prohibit particles from passing to the outlet.

Adding a hydrophobic membrane to the device of Irving *et al.* would have been obvious in view of the teachings of Bradley. In particular, adding the hydrophobic membrane to selected areas between the base (reference item 10)

and the cyclonic separator (reference item 20) (these areas defined by the lower openings (reference item 19) would allow air to escape the sampler while also prohibiting any liquid and/or particles from escaping. This would increase the probability of detecting airborne contaminants.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Irving *et al.* with the teachings of Bradley to provide an apparatus for collecting airborne particles comprising a separator, a collector, and a hydrophobic membrane.

5. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Application Publication 2004/0107782 to Bradley *et al.* in view of United States Patent 6,082,179 to Jeon *et al.*

Bradley *et al.* teaches a sampler comprising an upper element (figure 4 - reference item 63) and a fluid chamber (figure 4 - reference item 46). The upper element comprises a funnel structure above a hydrophobic membrane (reference item 24). Bradley *et al.* does not teach a method of sampling using a particle stream separated from an air stream.

Jeon *et al.* teaches a method to sample an air stream using an input fitting (reference items 13 and 14) and a funnel-shaped cyclonic separator (reference item 9). In use a suction pump (reference item 2) draws air through the fitting and into the cyclone. The cyclone produces a concentrated particle stream that travels through the intake (reference item 15). Particle-free air exits the cyclone via a second conduit (reference item 12). Jeon *et al.* teaches

that the cyclone separator is beneficial in producing an increased sample size while maintaining a small-sized apparatus. Replacing the upper element and cap (reference item 61) of Bradley *et al.* with a cyclonic separator would allow a higher concentration of particles to be produced thus increased the probability of detecting the particles.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bradley *et al.* with the teachings of Jeon *et al.* to provide a separator for producing a particle stream in an analysis method.

Allowable Subject Matter

6. Claims 13-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


United States Patent 6,729,196 to Moler *et al.* teaches an air sampler using microfluidic channels.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Rogers whose telephone number is (571) 272-2205. The examiner can normally be reached on Monday - Friday (0730 - 1600).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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14 March 2005


HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800